The use of rutin in a cat with idiopathic chylothorax

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Abstract — A 9-year-old, male castrated cat was presented with labored breathing and lethargy of 5 d duration. Idiopathic chylothorax was diagnosed based on clinical signs, thoracic radiographs, and thoracentesis. Partial resolution of the pleural effusion followed treatment with rutin, a benzopyrone extracted from plants. The etiology, diagnosis, and treatment of this disease are discussed.

Résumé — Utilisation de rutine chez un chat atteint d'un chylothorax idiopathique. Un chat mâle, castré, âgé de neuf ans a été présenté avec une respiration laborieuse et une léthargie durant depuis cinq jours. Un chylothorax idiopathique a été diagnostiqué en se basant sur les signes cliniques, les radiographies thoraciques et la thoracocentèse. Une résolution partielle de l'effusion pleurale a été obtenue à la suite d'un traitement à la rutine, une benzopyrone d'origine végétale. L'étiologie, le diagnostic et le traitement de cette maladie sont discutés.

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A 9-year old, castrated, overweight male (7 kg), indoor domestic shorthair was presented with a history of open-mouth breathing and lethargy of 5 d duration. The only abnormalities identified on the physical examination were increased tracheal and lung sounds. The lung sounds were most prominent dorsally and bilaterally; heart sounds were muffled.

Thoracic radiographs revealed extensive pleural fluid occupying more than 66% of the thoracic cavity. Aerated lung was present only in the caudal 1/3 of the thorax. Loss of detail made it difficult to visualize the cardiac silhouette, and the trachea appeared to be in a slightly more dorsal position. A complete blood (cell) count (CBC) was subsequently performed by a commercial laboratory (Vita-Tech Laboratories, Markham, Ontario). Abnormalities noted were a mild lymphopenia (1.0×10^5/L; reference range, 1.5 to 7.0×10^9/L), moderate thrombocytopenia (117×10^9/L; reference range, 300 to 800×10^9/L), and an increased hematocrit (0.49 L/L; reference range, 0.24 to 0.45 L/L). Results of serum DNA tests (Vita-Tech Laboratories) for feline infectious peritonitis (FIP) were positive. According to the laboratory report, the form of FIP virus detected had an increased likelihood of causing disease in the future.

Thoracentesis yielded approximately 20 mL of an odorless, pink-tinged milky fluid from the right thorax between ribs 7 and 8 at the level of the costochondral junction. The watery fluid had a specific gravity of 1.037 (reference range for chylous fluid, 1.010 to 1.050) and total protein content of 0.093 g/L (reference range for chylous fluid, 0.0215 to 0.100 g/L). Triglyceride and cholesterol concentrations were not obtained; however, the pleural fluid remained opaque even after centrifugation, indicative of a chylous fluid. Findings on cytological analysis of the pleural fluid (Histovet Surgical Pathology, Guelph, Ontario) consisted of a scattering of benign small lymphocytes intermingled with a few reactive mesothelial cells and neutrophils on a proteinaceous background. These findings along with the laboratory results, clinical signs, and thoracic radiographic findings were most consistent with a diagnosis of idiopathic chylous effusion. The differential diagnoses included heart disease, mediastinal mass (malignant lymphoma), obstruction or traumatic rupture of the lymphatic duct, and infectious disease (heartworm infection).

The cat was treated with rutin (General Nutrition Centers, Pittsburgh, Pennsylvania, USA), 250 mg, PO, q8h, until complete resolution of the effusion was achieved. A low fat prescription diet (Walthams Calorie Control, Vernon, California, USA) was also instituted. Since respiratory distress abated following thoracentesis, repeating the procedure was delayed until needed. On day 20, the cat was reexamined. Thoracentesis was not needed during this time, as exercise tolerance had improved with administration of the rutin. The owners reported the cat's full return to its usual attitude and energy level. Clinical signs of respiratory distress were no longer evident, although the lung sounds were still slightly increased. No other abnormalities were found on physical examination. A follow-up radiograph indicated that the functional lung field had doubled since the thoracentesis and the initiation of rutin therapy. The owner was instructed to continue with the treatment and to

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return the cat on day 63 for a physical and radiographic examination. On day 63, lung sounds were auscultated bilaterally and a thoracic radiograph indicated that there was 30% more lung capacity than reported on day 20. The owner was instructed to decrease the rutin dose to 500 mg, PO, q24h, and to maintain the cat on a low fat diet.

Chylothorax is the accumulation of a chylous effusion composed of lymph, protein, and high concentrations of triglycerides (chylomicrons) and other products of lipid digestion within the pleural space. Normally, chyle is transported from most areas of the body, except the right side of the head, neck, and forelimb, to the thoracic duct. This duct then empties into the left brachiocephalic vein at the thoracic inlet (1). Consequently, any pathological process that reduces or prevents the flow of chyle into the brachiocephalic vein will increase the lymphatic pressure and cause chyle to leak out of the vessels into the thoracic cavity.

Chylothorax has been reported in numerous species, including bovine, canine, and feline. However, chylothorax is relatively uncommon in cats. Regardless, it may be difficult to treat depending on the underlying cause (2). The 2 most common causes in the cat are cardiomyopathy (3) and a mediastinal tumor mass (4). Unfortunately, with this case and many others, the underlying etiology often remains undetermined (idiopathic chylothorax), making treatment a challenge. This cat did test positive for FIP, based on DNA analysis. However, histological demonstration of lesions is still the only definitive means by which a diagnosis of FIP can be established with absolute certainty and, then even, the appropriate clinical signs should be present. It is unlikely that FIP was the underlying cause of reduced flow into brachiocephalic vein at the thoracic inlet (1).

Cats with idiopathic chylothorax usually have labored breathing due to atelectasis of the lungs by chylous fluid. However, such patients can also exhibit signs of exercise intolerance, lethargy, tachypnea, coughing, and weight loss.

The most accurate means of diagnosing chylothorax is through radiography and cytologic examination of fluid obtained by thoracentesis. The predominant cell types in chylous fluid are lymphocytes and neutrophils (5). Triglycerides are usually in higher concentrations in chyle than in serum, while cholesterol concentrations are the same or less than those found in blood serum (2). To further rule out other potential causes, ultrasonography is an excellent means of evaluating the heart for cardiomyopathy and detecting mediastinal masses.

Traditionally, the treatment of idiopathic chylothorax has been palliative, involving frequent thoracentesis and a low-fat diet. Chyle, an irritant fluid, can cause severe fibrosing pleuritis in chronic cases. The fibrosis results in thickening of the pleura, which restricts normal pulmonary expansion and leads to a grave prognosis, because response to medical and surgical treatment is very poor at this stage. For this reason, it is important to limit fluid accumulation (6).

Thoracentesis can also have a negative effect on treatment. For severely compromised animals, the aim is to remove only enough fluid from the pleural space to relieve life-threatening dyspnea. Significant improvement in respiration has been seen with the removal of 10 mL of fluid/kg BW. The rate of fluid removal is important because of the lag phase between removal of fluid and reexpansion of the lungs. Rapid removal of large quantities of fluid at one time can put the patient at considerable risk because of third space loss (7). Other disadvantages of frequent thoracentesis include the additional stress that cats endure during the procedure, along with the potential adverse effects of dehydration, hypoproteinemia, hyponatremia, and hyperkalemia (8). For these reasons, it is crucial that physical and biochemical parameters be monitored at regular intervals during this process.

Rutin, a benzopyrone extracted from plants, has been marketed as a nutraceutical and is available as an over-the-counter product at health food stores. It comes in the form of a gel capsule and apparently is not linked with an unpleasant taste or odor to cats. Rutin has more commonly been used in human medicine for the treatment of lymphoedema following axillary lymph node excision. The exact mechanism of action is unknown; however, it has been proposed that rutin reduces leakage from blood vessels, increases proteolysis and removal of protein from tissues, and enhances macrophage phagocytosis of chyle (9).

Treatment with rutin in this case resulted in the functional lung space approximately doubling within 20 d, similar to that reported in a previous case series, where treatment with rutin showed clinical improvement in 3 of 4 cats diagnosed with idiopathic chylous effusion (10). Unfortunately, evaluation of the efficacy of rutin has been complicated, because cats can experience spontaneous resolution of idiopathic chylothorax. For the cat in this report, the disappearance of clinical signs within the first few days of initiation of treatment would seem to be more than just coincidence. Another interesting finding not previously reported with rutin is that partial resolution of fluid accumulation in the pleural space occurred without mechanical removal by thoracentesis. In the literature reviewed on chylothorax in cats, repeated thoracentesis was always performed, with significant volumes of fluid being removed to relieve the patient's respiratory distress. It can be argued that rutin may work on its own and not require mechanical fluid removal from the chest. Perhaps the rate of fluid removal and return of functional lung field would have been even greater if intermittent thoracentesis had been performed. The current dosing regime for rutin in cats is 250 mg, PO, q8h and in dogs 250 to 500 mg, PO, q8h (7).

Other hypothetical explanations for the improvement seen with this cat include the possibility that there may have been resolution of some other disease entity at the same time as rutin was prescribed, and that this caused the improvement in clinical signs. As previously stated, however, the cat may just have recovered spontaneously.

With idiopathic chylothorax, medical treatment is usually instituted first; if treatment over 5 to 10 d is unsuccessful, surgical intervention is the route chosen. The most common surgical technique is thoracic duct ligation, which redirects flow of chyle in the thoracic duct into the caudal vena cava or azygous vein. Successful resolution of the effusion using this technique has been reported in approximately 50% of the cases (7).

There is still much to be learned about idiopathic chylothorax, and the exact role that rutin plays in improving clinical signs needs to be further investigated. It will be interesting to see how long rutin will have to be administered in this cat, and if complete resolution of the pleural effusion is possible.

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